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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/919,086

07/31/2001

Jun-Sik Kim

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(PO2001-5US)

2476

570

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09/08/2004

AKIN GUMP STRAUSS HAUER & FELD L.L.P.
ONE COMMERCE SQUARE
2005 MARKET STREET, SUITE 2200
PHILADELPHIA, PA 19103-7013

EXAMINER

CHAWAN, SHEELA C

ART UNIT

PAPER NUMBER

2625

DATE MAILED: 09/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/919,086

Applicant(s)

KIM ET AL.

Examiner

Sheela C Chawan

Art Unit

2625

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 July 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 6 is/are rejected.
- 7) ☒ Claim(s) 2-5, 7 and 8 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 July 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Preliminary Amendment

2. Preliminary amendment filed on 7/31/01 has been entered.

Claim Objections

3. Claim 5, is objected to because of the following informalities:

In claim 5, line 3, change "step b" to -- c as a principal point and focal length -- .
Appropriate correction is required.

Drawings

4. Figures 1 and 2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.121(d)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 U.S.C. § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 5 and 7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 5, line 11 the phrase "calibration is performed by finding internal parameters, such as elements $U_0, V_0, f, d_1 - d_4$, which minimize the value of equation 9, on page 9 of the discloser line 14-17 " which is, not define clearly. The examiner does not understand what is the relation between U_0, V_0 and f and other elements as discussed below ".

$$F(u_0, v_0, f) =$$

$$\alpha (n_1 - n_2)^2 + \beta (n_3 - n_4)^2 + \gamma (d_1 - d_2)^2 + \lambda (d_3 - d_4)^2 + P_1 \sum |R_{c1}(n_1, d_1 - R_1| + P_2 \sum |R_{c2}(n_2, d_2) - R_2| + P_3 \sum |R_{c3}(n_3, d_3) - R_3| + P_4 \sum |R_{c4}(n_4, d_4) - R_4|$$

[Equation 9]", as recited vague and unclear. One skill in the art don't know

how these formula are being derive and being manipulated in the invention.

Please need explanation.

Specification

6. The disclosure is objected to because of the following informalities:

On page 9, of the specification and equation 9, how is calibration performed by finding internal parameters of elements such as U_0, V_0 and f which minimize the value of equation 9, which is, not define clearly in the specification. The examiner does not understand what is the relation between U_0, V_0 and f elements are these principal point and focal length of the camera. What is it please need explanation. Also on Page 9 of the specification equation 9 does not explain or derive how $d_1 - d_4$ are found. Page 5 of

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the specification discloses about concentric circle consisting of a circle having a smaller radius and a circle having a large radius including the smaller circle has the same normal vector and a vertical distance according to above condition. There is no support in specification or in figures how the equation 9 on page 9 is derived and how calibrations are performed by finding internal parameters using U_0, V_0 and f , respectively indicate a principal point and a focal length of the camera. The first two items $(\alpha (n_1 - n_2) + \beta (n_3 - n_4))$ indicate that two concentric circles have the same normal vector and next two items $(\gamma (d_1 - d_2)^2 + \lambda (d_3 - d_4))$ indicated that two concentric units area located on the plane having the same distance. In addition, next four items $(P_1 \sum |R_{c1}(n_1, d_1) - R_1| + P_2 \sum |R_{c2}(n_2, d_2) - R_2| + P_3 \sum |R_{c3}(n_3, d_3) - R_3| + P_4 \sum |R_{c4}(n_4, d_4) - R_4|$ which minimize the value of equation 9. On page 9 of the discloser line 16 through page 10, line 4. There is no logical explanation in the specification or in the drawings supporting how d_1, d_4 are vertical distances from camera and plane, (see also page 5, of specification line 10-12), this also applies to claim 7 which recites equation 9 in the claim.

Applicant is required to submit an amendment, which clarifies the disclosure so that the examiner may make a proper comparison of the invention with the prior art.

Applicant should be careful not to introduce any new matter into the disclosure (i.e., matter that is not supported by the disclosure as originally filed).

Claim Rejections - 35 U.S.C. § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1 and 6 are rejected under 35 U.S.C. 102(e) as being anticipated by Ekpar et al., (US.6,671,400 B1).

As to claim 1, Ekpa discloses a method of calibrating a camera by calculating camera parameters required to obtain geometric information of an object using projection invariable characteristic of a concentric circle comprising the steps of (column 2, lines 62 through column 3, line 6, column 6, line 38 through column 7, line 6);

taking a plurality of images of a calibration pattern (column 8, lines 20- 65) consisting of two or more (column 6, line 38 through column 7, line 6) concentric circles located at a same plane and having different radiuses at different angles to obtain

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images of ellipses as a result of the projection of said concentric circles (column 2, lines 62 through column 3, line 6, column 6, line 38 through column 7, line 6);

b) calculating (column 8, lines 20-46) the central points of the projected concentric circles using a given algorithm (column 10, lines 25- 48); and

c) calculating the principal point and focal length of said camera for tracing the location of a circle in a 3D space using a nonlinear minimizing method (column 3, line 54 through column 4, line 1-9) based on the central points calculated in said step (column 5, line 10 through column 6, line 67).

As to claim 6, see the rejection of claim 1.

Allowable Subject Matter

8. Claims 2 -5 and 7- 8, are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Other prior art cited

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Shum et al. (US.6,750,860 B1) discloses rendering with concentric mosaics.

Arndt et al. (US.6,088,098) discloses calibration method for a laser based split-beam method.

Mack et al. (US. 6, 195, 455 B1) discloses imaging device orientation information through analysis of test images.

Gupta et al. (US. 5, 559, 334) discloses epipolar reconstruction of 3D structures.

Zhang (US.6,437,823 B1) discloses method and system for calibrating digital cameras.


Jacobson (US.5,918,196) discloses vision system for analyzing solid – of – revolution radius profile.

Contact Information

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sheela C Chawan whose telephone number is 703-305- 4876. The examiner can normally be reached on Monday - Thursday 6 - 7.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on 703-308-5246. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Sheela Chawan
Patent Examiner
Group Art Unit 2625
September 3, 2004